

Update for Produced Neutrino Energy Spectra

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05 November 2004

The energy spectra of the produced neutrinos are necessary for the cross section measurement. I produced the spectra for ν_τ , ν_μ , and ν_e , which were produced with the E872 MC.

In order to see if these distributions make sense, it was suggested to look at other experiments that might have made a similar measurement. There are three experiments that I have explored.

- BEBC – 20 - 200 GeV – I found interacted energy spectrum, but not the produced neutrino energy spectrum.
- CHARM – 400 GeV – Again I found the interacted neutrino energy spectrum but not the produced spectrum.

- E613 – 400 GeV – Again I found the interacted energy spectrum, but they have fit their data and included the inputs they used. I can use this information to compare to my spectra. The following two figure show their data and the fits of $\frac{dN}{dE_\nu}$ vs. E_ν and $\frac{dN}{dp_t^2}$ vs. p_t for prompt neutrinos.
 - This data is from M.E. Duffy et. al., Phys. Rev. D:38:2032-2055(1988).

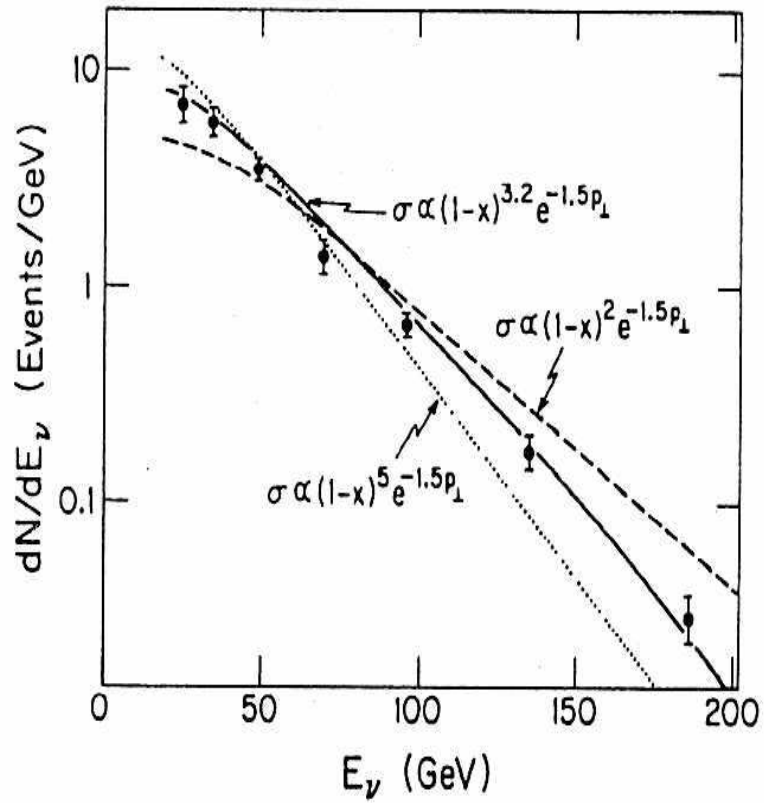


FIG. 20. Energy distribution dN/dE_ν of the measured prompt $\nu_\mu + \bar{\nu}_\mu + \nu_e + \bar{\nu}_e$ event rate per 10^{16} protons. The solid line represents the best fit to a $D\bar{D}$ production model (including detector acceptance) with $n=3.2$ and $b=1.5$. The dotted (dashed) line shows the spectra generated for $n=5$ ($n=2$).

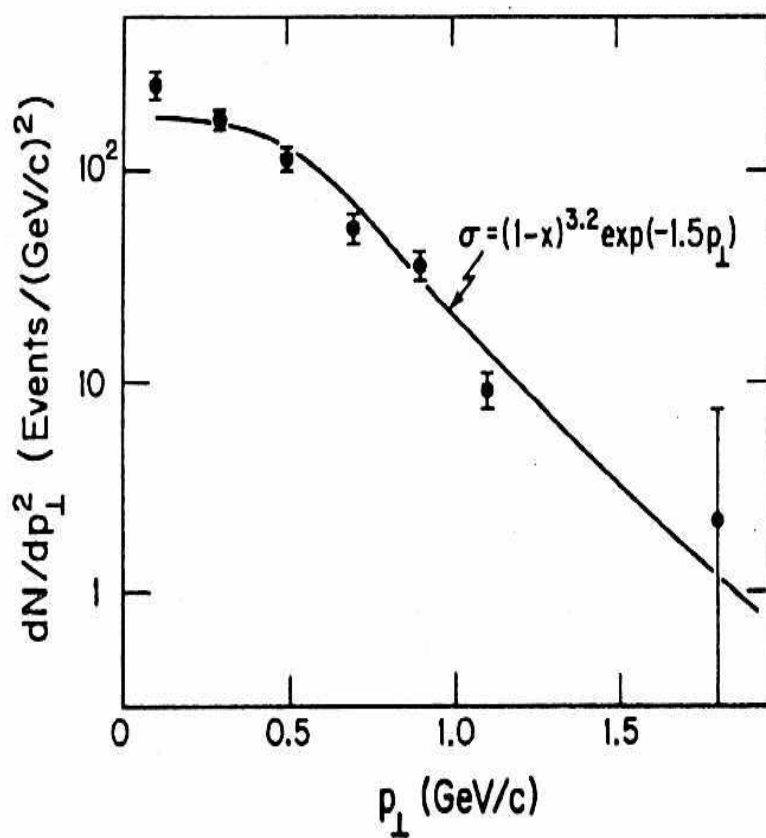


FIG. 21. Transverse-momentum distribution dN/dp_{\perp} of the measured prompt $\nu_{\mu} + \bar{\nu}_{\mu} + \nu_e + \bar{\nu}_e$ event rate per 10^{16} protons. The solid line shows the best fit to a $D\bar{D}$ production model (including detector acceptance) with $n = 3.2$ and $b = 1.5$.

Future Work

- I will run our Monte Carlo with 400 GeV protons.
- I will fit my data and compare to the fit they have. If everything is correct, these fits should match.